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The Central American Customs Union: potential economic and social impacts

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Contents

The Central American Customs Union: potential economic and social impacts

Abstract

The study shows the economic and social effects of the application of trade facilitation programs between the countries of the Central American Customs Union. The base work stems from the efforts of countries in the subregion to deepen the current Customs Union, mainly the three countries of the Northern Triangle (El Salvador, Guatemala and Honduras).

I. Background

International trade is much more open in the current world than it was at the end of the previous century. Most countries have reduced unilateral rates of tariff protection, and many have also engaged in preferential trade agreements which drastically reduce tariff rates on imports from partners in said agreements.

Among Central American countries, the average applied tariff rate for imported goods is low (2%). Nonetheless, there are several additional costs associated with the lack of infrastructure, as well as administrative barriers that hinder the potential offered by such a broad market (customs forms, phytosanitary and zoosanitary certifications, packaging requirements, and inspections in different stages of the exporting process, among others).

The concern over the persistence of non-tariff barriers in intraregional commerce has been one of the focal points in the Central American integration agenda in recent years. This has as its main priorities, among others; the implementation of the Customs Union Roadmap 2015-2024, the strengthening of physical regional connectivity, and the start-up of a Central American Strategy of Trade Facilitation. To accompany in this process, ECLAC has been supporting Central American countries by evaluating the cost associated with the non-existence of a Trade Facilitation Program, on the one hand, and on the other, by evaluating the implementation of a program that allows for the reduction of administrative trade barriers.

In 2015, at the request of the International Trade Minister of Costa Rica (COMEX in Spanish), the first exercises were carried out to identify the overrun cost caused by diverse administrative barriers to trade. The results served as a valuable input for the technical teams' discussion, which had been shaping the Central American Strategy of Trade Facilitation. Likewise, they also served to evaluate the cost associated to the lack of such a strategy. The existence of additional average costs for sub regional imports equivalent to a tariff rate of 24% above the unitary value of the traded goods was identified.

During 2016, at the request of the Central American Integration Secretariat (SIECA in Spanish), the Ministry of Economy of Guatemala and the Secretariat of Economic Development of Honduras, ECLAC evaluated the cost that would be associated with the removal of the administrative barriers previously calculated. The study considered enacting a trade facilitation plan where exclusive tariff rates were used between both countries. The negotiations concluded by implementing, in June of 2017, bi-national tariff rates in three of the main border crossings between Honduras and Guatemala. Through this, customs territories for both countries were integrated into one unique territory of a little more than 221 thousand kilometers, 52% of the total area of Central America. Customs formalities for 80% of the binational load were reduced from an average of roughly 10 hours, to less than 15 minutes (SIECA, 2018). After implementing the binational

Customs Union between both countries, during the second semester of 2017, El Salvador, through its Central Bank and Minister of Finance, solicited support from ECLAC to assist in a new evaluation process. This time, the inclusion of El Salvador in the Customs Union between Guatemala and Honduras was assessed.

The present chapter consolidates the main results of the technical support that ECLAC has provided to the governments of Costa Rica, Guatemala, Honduras and El Salvador, as well as to the Secretariat of Central American Integration. For reasons of confidentiality, the results presented are general and referential, intending to illustrate the main themes covered in each case: the macroeconomic, social and tax effects originated from the programs of trade facilitation.

The motivation for this chapter is threefold. Firstly, to present *ad valorem equivalents* (AVE) associated with the administrative barriers to trade in Central America. Secondly, to present the economic and social effects of the reduction of said barriers for countries of the Northern Triangle (El Salvador, Guatemala and Honduras). Lastly, the inclusion of new scenarios extending the Customs Union for the group of Central American countries (incorporating Costa Rica, Nicaragua and Panama).

The second section presents a review of the literature on the two main methodologies applied to measure the impacts of trade facilitation: gravity models and computable general equilibrium models. The first model is applied to evaluate the associated cost of the multiple administrative barriers present in intraregional trade. The second is applied to evaluate the effects of the trade facilitation programs.

The third section reviews the state of regional integration in the economic scope, quantifying administrative barriers through AVE calculations, and the initiatives undertaken by the countries to strengthen the Customs Union. The fourth section presents results of the main scenarios used to evaluate the effect of implementing trade facilitation programs between Guatemala and Honduras, and between both countries and El Salvador in what would be the Customs Union between the three countries of the Northern Triangle. Likewise, the implications for countries not involved in such programs are presented (Costa Rica, Nicaragua and Panama), as well as the result of the impact of a tariff facilitation program including all Central American countries. The fifth section concludes.

II. Literature review on methodologies to assess the impact of trade facilitation programs

This section presents a selection of the main work linked to the quantification of trade facilitation measures, focusing on its two main contenders: gravity models and computable general equilibrium models. The objective of this review is twofold. Firstly, to identify background studies that evaluate and estimate the associated cost of non-tariff measures (NTMs) of an administrative nature, specifically through the calculation of *ad valorem equivalents* (AVEs). Secondly, to define the main analytical methodology that allows for the evaluation of the expected impact of the removal of said barriers on production and trade.

Trade facilitation measures are characterized by a variety of activities, such as the reduction of required administrative processing in customs, improvements in transparency, reduction in smuggling, construction of electronic systems for processing cargo, and the development of modern systems that streamline intraregional transport, such as the use of Quick Response codes (QR) that scan customs documents. In the case of the Central American Trade Facilitation Strategy (SCFC in Spanish), measures such as the automation of transit processes for merchandise, the reduction of export/import time, and the automation of the movement of people are relied on. For the purpose of the present analysis, only the first two measures are included. Implementing these requires substantial investments in infrastructure, as well as reforms in trade processes.

Applying an economic model that evaluates the removal cost of administrative barriers and bottlenecks to the full capacity of a Customs Union requires in first instance the quantification of said barriers by identifying the tariffs, and later, incorporating the estimates in a model that simulates the political shocks of removing said costs. In this way, the economic impacts on production and trade, as well as the social impacts on wellbeing and employment, can be derived. A brief review of the literature on studies following these guidelines proceeds, as well as a brief methodological description of the models applied for the calculation of *ad valorem equivalents* of the administrative barriers, and of the impact simulations presented later.

A. Gravity models as a tool to estimate administrative costs

Due to the strong reduction in tariff rates at a global level as a result of unilateral opening processes and the large amount of free trade agreements in force, trade facilitation (TF) has become an important concept in analyzing the context of international trade. This, most notably, after the implementation of the World Trade Organization agreement about TF in 2017. Currently, non-tariff factors affecting the trade of merchandise are frequently of more importance than tariffs. The irruption of the phenomenon of global value chains significantly increases trade in intermediate goods, resulting in important multiplier effects from the reduction of non-tariff barriers. A study of the International Monetary Fund determined that a modest improvement in trade facilitation would increase global Gross Domestic Product (GDP) by 2.6%, with an increase of 9.4% in world exports (WEF, 2013).

Different aspects of trade facilitation, understood in a limited way as the improvement of border management processes such that import and export operations are more agile and simple, have a direct effect in reducing the cost of trade (WTO, 2015)[1]. Such measures (the use of a single window, reducing the use of paper, or using specialized border posts) are fundamental in significantly advancing trade, diversifying exports and increasing economic wellbeing. In its broadest definition, TF also includes political measures that influence the efficiency of transport and logistics services (APEC, 2007).

From the early 2000s, a series of studies have developed methodologies to estimate non-tariff barriers to trade. The most commonly used method is the estimation of a gravity equation. This method is complemented by spatial economics (Fujita, Krugman and Venables, 2000), and by the work of Anderson and Wincoop (2003), which considers distance and other factors that determine exports (exporting rights, inspections, number of documents required to export, among others). Following this approach, several studies have estimated the impact of trade facilitation, evaluating the elasticity of trade with respect to different measures – mainly the reduction of time spent processing at the border (for example, customs clearing, management, and waiting times at ports).

Wilson, Mann and Otsuki (2003) were among the first investigators to develop a series of TF measures for estimating different logistical aspects at the border for the 19 member countries of the OECD. Later, Wilson, Mann and Otsuki (2004, 2005) extended their estimations to a broader range of countries (75). Through their econometric estimations, they calculated profits from trade due to TF in the order of 377 billion dollars.

Different econometric analyses use different TF measures. Nonetheless, all find these measures to be significant when determining large or small flows of bilateral trade. Hummels and Schaur (2013) and Djankov, Freund and Pham (2010) study the effect of processing time on trade. Traca and Dutt (2007) analyze the consequences of corruption. Limão and Venables (1999) evaluate the efficient use of infrastructure.

[1] WTO(2015) presents a series of definitions that have as the common denominator to increase efficiency in trade processes, control, and transit of merchandise. For more detail, refer to the introduction of such study.

Several studies conclude that improving TF indicators increases trade in one or several countries. On the contrary, the non-tariff barriers attributable to the non-existence of TF measures reduce trade (see table 1). Additionally, Saslavsky and Shepherd (2012) provide additional evidence for the case of global value chains. In the case of Eastern and Southeastern Asia, Cheewatrakoolpong and Ariyasajjakorn (2012) conclude that trade facilitation (as measured by lower processing times and lower associated costs) has a significant impact on the improvement of trade flows. This effect is strongest in food exports and agricultural products.

Among the reviewed studies, those by Zaki (2010a; 2014) stand out. Beginning from a theoretical model with microeconomic foundations, a gravity model is derived in two stages. This estimation allows for the calculation of equivalent tariffs corresponding to a series of TF measures. Of the specifications put forward by Zaki, the fact that estimations on a sectoral level were carried out stands out. Particularly, the results obtained show that perishable products (food and beverages), seasonal products (clothing and footwear), and those of high value added are the most sensitive to delays in transit times. This is reflected in higher AVE estimations for these kinds of products.

Table 1
Selected studies on the estimated effects of trade facilitation variables on the trade of goods, using the gravity model

Authors	Countries studied	Results
Wilson, Mann and Otsuki (2003)	APEC member countries (19)	If the countries with indicators below the average were to improve by 50% their facilitation indicators, intra-APEC trade would increase 254 billion dollars, equivalent to 21%.
Wilson, Mann and Otsuki (2004, 2005)	75 countries of different regions	A 50% reduction in the facilitation indicators would generate trade profits of US$377 billion dollars.
Djankov, Freund and Pham (2010)	98 countries	A one-day delay is associated with a 1% reduction in bilateral trade.
Zaki (2010a)	138 countries	An increase of import documentation (export) of 10% increases import time by 6.2% (export time in 8.1%). On the other hand, increasing the transparency of the process by 10% reduces import time by 4.4%, and export time in 4.9%.
Djankov, Freund and Pham (2010)	98 countries	A one-day delay is associated with a 1% reduction in bilateral trade.
Dennis and Shepherd (2011)	118 developing countries	A 10% reduction in the associated costs of trade facilitation increases the number of exported products by 3%. Improvements in trade facilitation contribute to the diversification of exports and the incorporation of new products.
Novy (2011, 2012)	13 OECD countries	The cost of trade of the United States with its main trading partners was reduced by 40% between 1970 and 2000. The largest reductions were seen in trade with Mexico and Canada.
Kelleher and Reyes (2014)	Central America	AVE estimation of the sanitary barriers in 5 Central American countries. They estimated an additional cost of 28% on the price of imported Central American products, with larger effects seen in the case of imports of Guatemala, where the AVE reached 55% of the products value.
Zaki (2014)	165 countries	AVE estimation for a set of non-tariff barriers. The highest AVEs correspond to exports of chemical products (31.3%) and imports of rubber (65.7%).

Source: ECLAC, based on several studies.

As for Central American countries, there are studies evaluating the impact of non-tariff measures on the prices of some important products in intraregional trade: meat, bakery products, dairy products, and chicken. These studies estimated high costs associated to such measures (World Bank, 2013). Kelleher and

Reyes (2014) estimated that the existence of at least one non-tariff measure, in a set of 33 countries, increased domestic prices by 8-11%. Likewise, they estimated that a sanitary barrier would cause price increases equivalent to an average tariff of 21.4%. For certain products, these increases could be particularly high. This is the case for beef, planning products and chicken, for which equivalent tariffs were estimated at 68.4%, 51.4% and 22% respectively.

Using a gravity model, Kelleher and Reyes (2014) estimated the AVE of sanitary and phytosanitary measures in five Central American countries, identifying an average cost of 28% in addition to the value of the imported Central American products, with higher effects in the case of imports in Guatemala, where the AVE reached 55% of the products' value. Costa Rica obtained a lower AVE estimation than the rest of the countries in the Central American isthmus, where the AVE exceeded 20%.

ECLAC (2017), following the methodology of Cheewatrakoolpong and Ariyasajjakorn (2012), utilized an augmented gravity model to identify the sensitivity of trade to a series of dimensions of trade facilitation. Such specification was complemented by applying the approach of Zaki (2010a, 2014), where a regression was estimated using export/import time as a dependent variable of its main determinants (number of import/export documents (Doc), number of necessary formalities to export/import (Proc), and the export cost in dollars per container (Cont)). This first stage in the estimation was defined as follows:

$$\ln\left(Time_{exp,i}\right) = \alpha_0 + \alpha_1 \ln\left(Doc_{exp,i}\right) + \alpha_2 \ln\left(Proc_{exp,i}\right) + \alpha_2 \ln\left(Cont_{exp,i}\right) + \omega_i \quad (1)$$

$$\ln\left(Time_{imp,j}\right) = \alpha_0 + \alpha_1 \ln\left(Doc_{imp,j}\right) + \alpha_2 \ln\left(Proc_{exp,j}\right) + \alpha_2 \ln\left(Cont_{exp,j}\right) + \omega_j \quad (2)$$

The estimates for time obtained in (1) and (2) were introduced to the augmented equation:

$$ln\left(X_{ijk}\right) = A + \beta_1\, ln(Y_{ik}) + \beta_2\, ln(Y_{jk}) + \lambda_j + \chi_i - \gamma_{ijk}\, ln\left(D_{ij}\right) + \omega_{ijk} + e_{ijk} \quad (3)$$

where *k* represents product group classifications; X_{ij} the exports of country *i* to country *j*; Y_i (Y_j) represents country *i (j)'s* GDP; D is a vector that represents the variables related to distance between countries (including time, the main variable used to define cost due to administrative barriers); the variables x_i and λ_j are fixed effects associated to each country; τ_t is the fixed effect of the year; ω_{ij} is the variable assocated with the probability of trade between a country and a partner j ; and e_{ij} is the stochastic error term associated to the non-observed variables.

Following Zaki (2010a and 2010b), the results of the estimated parameter γ_{ijk} that express changes at a trade level were transformed into a political variable, taking the gains or losses of trade derived from time to an equivalent tariff for bilateral commerce for each of the countries considered in the model.

The transformation of the estimated parameter into AVE was conducted by obtaining the proportion between the predicted coefficient for the variable of exporting (importing) time and the elasticity of demand, which was in turn multiplied by the number of necessary days to complete the formalities of international trade, as follows:

$$EAV_{f,i-j}^{k} = \left(\frac{\gamma_i^k}{\varepsilon_{ik}} * t_f\right) \quad (6)$$

where γ is the coeficiente associated to time in the gravity equation, *f* represents trade flows, which could be exports or imports; *i* is the exporting or importing country; *k* identifies the product group; *t* the time expressed in days, and ε_{ik} is the elasticity of demand of country *i* for product *k*.

Finally, the result is the *ad valorem equivalent* associated to exports/imports of goods of the k^{th} sector of the economy. The third section presents the results of the estimates for the group of Central American countries. These results will be used as the main inputs in determining the political scenarios to evaluate in a trade facilitation program (TFP), firstly between Guatemala and Honduras, next between the three countries of the Northern Triangle (El Salvador, Guatemala and Honduras), and finally, in a scenario that includes all member of the Central American Common Market.

B. Computable general equilibrium models and trade facilitation

The use of CGE models for the analysis of trade facilitation is relatively recent. These models allow for the quantification of the benefits of trade facilitation at a global, regional and national level.

Many CGE analyses simulate the reduction of trade costs through productivity shocks. APEC (1999), using the dynamic version of the GTAP model, found that a 1% reduction in transaction costs in trade for industrialized countries and of 2% in developing countries would result in welfare gains of 46 billion dollars for APEC member countries. On the other hand, Francois, van Meil and van Tongeren (2003), using a version of imperfect competition of the GTAP model in the manufacturing sector, and assuming a reduction of 1.5% in transaction costs, estimate global benefits at around 72 billion dollars. This is a similar figure to that obtained by the OECD (2003) upon evaluation of a 1% reduction in transaction costs using the standard model of GTAP. A common aspect in these investigations and others similar (Hertel, Walmsley and Itakura, 2001; Fox, Francois & Londoño-Kent, 2003) is that they assume single reductions in all products, without differentiating between countries or groups of countries. On the other hand, the productivity shocks are not endogenously modelled. That is to say that the efficiency gains come without an additional cost, which ignores adjustments, so that the benefits of trade facilitation are overestimated.

Walkenhorst and Yasui (2009) attempt to include adjustment costs (for example, a reduction of the number of employees required to complete the formalities) and analyze the impact in the world economy of a reduction of transaction and trade costs at the border, using the GTAP model. This analysis includes direct costs associated with complex and bureaucratic customs systems, complex and non-transparent documentation, long wait times to complete customs clearing procedures, and the indirect costs associated with the additional waiting time at the border and non-anticipated delays due to strikes and political situations. Mirza (2009a, 2009b) carries out a cost-benefit general equilibrium analysis of trade facilitation. On the other hand, Minor and Tsigas (2008), based on Hummels and Schaur (2013), estimate AVE for the required time to trade at a product and regional level. Relying on these AVEs they simulate the effects of time reduction on prices and estimate the impacts on trade.

The use of AVEs in general equilibrium models to estimate the impact of trade facilitation is contemplated in several studies. Mirza (2007) analyses the role of BNAs in Bangladesh trade flows using a modified gravity model, with emphasis on the textile and car-parts sectors, and incorporates them in a general equilibrium model. More recently, Zaki (2010b) developed a dynamic general equilibrium model that incorporates aspects of trade facilitation. This was done by calculating AVEs of import and export times at a sectoral basis. According to Zaki (2010b), these AVE include costs associated to the processes at the border such as time, documentation, corruption, Internet access and other geographic aspects.

Zaki (2010b) simulates for Egypt a reduction of AVE to levels of best practice, in this case to those of the United States, with a reduction in AVEs of 90%. In a second scenario, the cost of trade facilitation is added to the AVEs. In this, the level of public expenditure in transport and communication is increased by 30% (to evaluate the effect of more efficient infrastructure for transport), and the level of public salaries is increased by

10% (to reduce corruption). The results shed light on the positive effects of public policies oriented at the promotion of efficiency and the increase in productivity of the entire economy. Among such measures are better use of information systems at customs, improvements in infrastructure and communication, and the increase in the salaries of public officials that work at customs.

ECLAC (2015), using a computable general equilibrium model (CGEM), evaluated the effects of a trade facilitation program that reduced the calculated AVEs (in average 24% for all Central American trade) to 2.2%, in a similar manner as the improvements applied by Zaki (2010b) when considering a reduction of 90% in all Central American countries. The results indicated that, in terms of the effects on the product, the impact could mean an average increase of 3% - figure that was reduced to a little more than 1.4% in the case of a reduction of only 50%; that is, from an *ad valorem equivalent* of 24% to one of 12%.

The work developed by ECLAC between 2015 and 2018 has used the CGEM GTAP. This has the particularity of being a multiregional and multisectoral model that employs databases of the input-output matrices obtained either from the national statistics offices of every country or from expert academics on national accounts. In this way, it was guaranteed that the model would respond to the productive structure of the countries and regions analyzed. Data on international trade and transport complemented the information of the input-output matrices. All countries in the model are interconnected by bilateral trade flows. In this way, the multiple existent value chains in the global economy are considered, and particularly the interconnectedness between the Central American economies, since they all form part of both the data base and the GTAP model.

The model itself is represented as a series of simultaneous equations, and can be schematized through the interaction between households, firms and governments; all economic agents of each region or country of the model. It is assumed that each firm produces one single good for which it requires primary factors (qualified labor, non-qualified labor, land, capital, and natural resources) and the respective intermediate inputs. Diagram 1 shows schematically the interaction of the flow of value between the different elements in the model. In each economy, the production behavior is characterized by the maximization of the firm's profit. These combine resources or factors with intermediate inputs in a structure nested in the Constant Elasticity of Substitution (CES) framework, with imperfect substitution in each step of the production process (between factors of production and intermediate inputs, and between intermediate domestic inputs and intermediate imported inputs from diverse regions of the model).

The model includes one regional household in each economy, which distributes income through the consumption of private households, public consumption through the government as an agent, and future consumption as a form of savings. The savings of each household are collected by a Global Bank and are distributed between the regions as investments in capital dictated by rates of return.

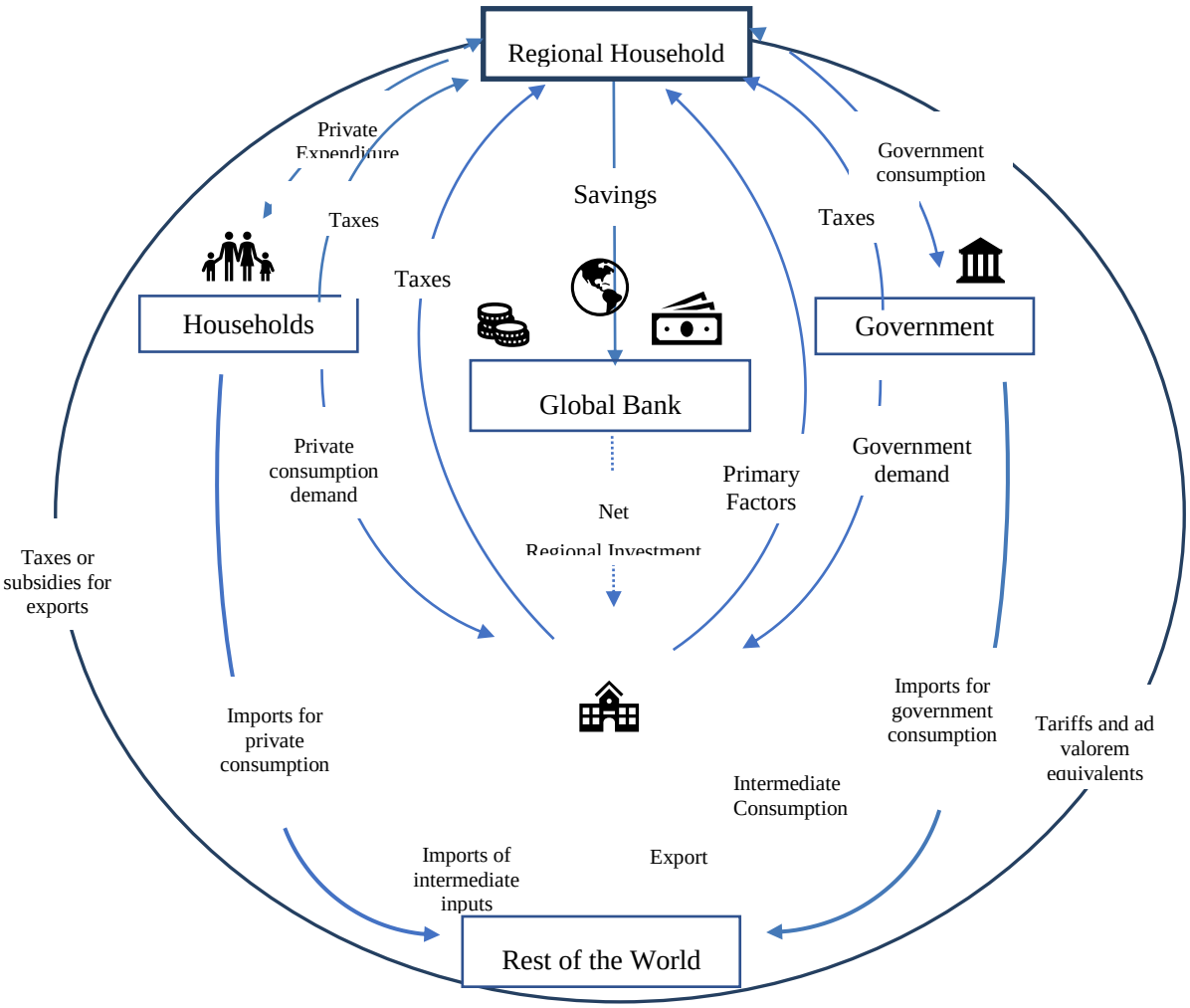
Consumption decisions by households and firms distinguish between domestic and imported goods, and between imported goods according to their origin (Armington, 1969). This assumption allows for the modelling of the flows of one good in two different directions: the same good can be exported and imported simultaneously. Nonetheless, it makes imports perfect substitutes of domestic products.[2]

The baseline for the structure of the model employed for the simulations and exercises carried out in this chapter corresponds to the year 2011. For tariff protection, a revision of tariffs up to 2017 was undertaken, including also the state of tariff preferences received and conceded by the countries of other trading partners

[2] For a more detailed revision of the GTAP, its structure and particularities see Schushny, Durán and De Miguel (2007).

until December 2017 (United States, European Union, among others), and the estimations *ad valorem* calculated according to the method above described.

Diagram 1
Schematic representation of the GTAP model



Source: Author's own elaboration, on the base of Schuschny, Durán and De Miguel (2007) "GTAP model and preferential tariffs in Latin America and the Caribbean: reconciling base year with the recent evaluation of the regional liberalization agenda".

The applied model considers 33 sectors of goods and 1 of services, and a set of 34 regions and/or countries, which considers every Central American country individually. Annex 1 and 2 presents in detail all sectors and/or countries considered.

III. Current state of the Central American Customs Union, and evaluation scenarios of ongoing initiatives

This section presents the development of tariff protection for each country and the whole of Central America, as well as the development of the participation of international trade in intraregional value chains. It also describes the progress and state of the Customs Union in the field of trade facilitation, key element in the process that several countries in the subregion have begun to move forward on in consolidating the Customs Union. The section closes with the description of the diverse scenarios that will be simulated to derive the economic and social impacts.

A. Tariff and non-tariff protection

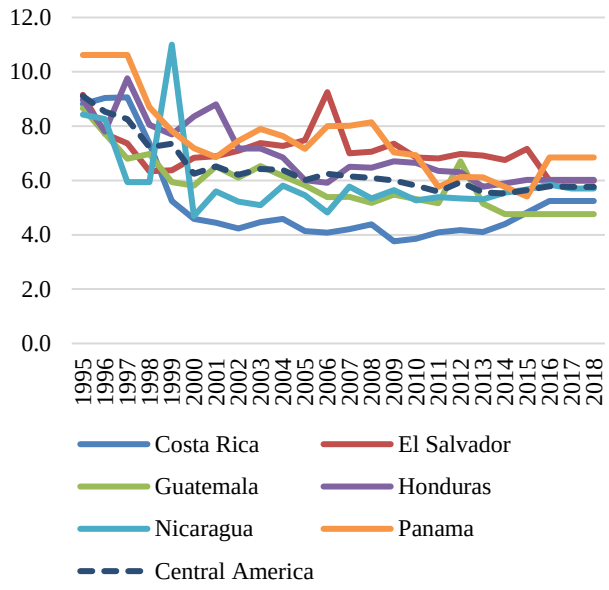
Although the average Central American tariff (Most Favored Nation, MFN) is near 6%, once considering all free trade agreements that the subregion is subscribed to, the average applied tariff rate is reduced to 2% (see graph 1). This shows the high level of openness to trade of all member countries of Central American Common Market (CACM). All members, except for Panama, have applied tariff rates that fall below the average.

Due to the full validity of the free trade zone for 99% of the products that form the exporting basket of a country, the tariff protection for intraregional commerce is very limited. The average tariff for intraregional flows is of 0.8% being the highest in foods, beverages and tobacco, due to several exceptions contemplated in Annex "A" of the General Treaty on Central American Economic Integration (TGIEC in Spanish). The products that pay high tariffs are unroasted coffee and cane sugar, since they are subject to restrictions in all five countries. Another group of products with bilateral restrictions are ethyl alcohol, derivatives of petroleum and distilled alcoholic beverages. Of these, the products that pay higher customs duties are sugar and confectionary products (17%) (Cordero, 2017).

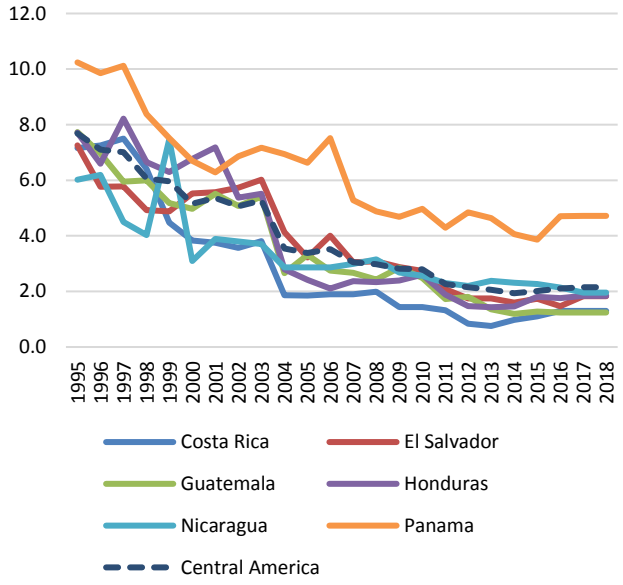
Although tariff protection is very low, the existence of a series of administrative trade barriers, reflected in the time required to export and import, as well as other non-tariff measures, mean that, on average, Central American imports face an additional tariff of 18% (see figure 1). This is higher in the case of agricultural products, textiles, confections and footwear, as well agroindustry products. When estimating AVE for the non-tariff measures, it was determined that these represented on average a similar amount to the intraregional average (0.8%), with a higher incidence in the case of chemical products, petrochemicals, the agroindustry and agriculture, although not as elevated as the administrative barriers (see table 2). It is therefore evident that the main problem for an average exporter in Central America are high administrative trade barriers.

Figure 1
Central America: The evolution of tariff protection, 1995-2018

a) Average MFN tariffs

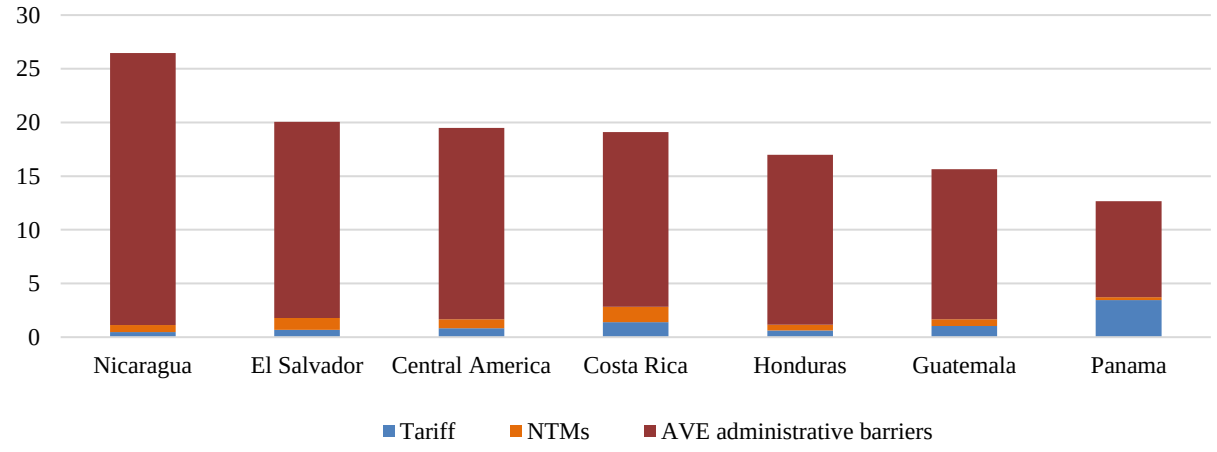


b) Preferential Tariffs



Source: Author, based on the database of weighted most favored nation tariffs presented by the World Bank, the database of tariffs of the World Trade Organization, the Economic Secretariat of Central American Integration, and own calculations, considering preferences granted to partners with which every Central American country possesses current trade agreements.

Figure 2
Central America: Tariff and non-tariff protection, around 2017
(In ad valorem percentage)



Source: Authors calculations, based on official information from the World Trade Organization and official information from all countries. Methodological details are described in the footnote of table 1, and in more detail in section 2.1 of this chapter.

Table 2
Central American Common Market: Tariff protection and tariff equivalents of the non-tariff and administrative measures applicable to intrasubregional imports, 2017
(In percentage)

Economic sectors	Intra-Central American tariffs[a] (1)	AVE due to NTMs[b] (2)	AVE due to administrative trade barriers[c] (3)	Tarif and non-tariff protection (4)=(1+2+3)
Agriculture, hunting and fishing	0,8	0,9	31,7	33,4
Oil and mining	0,0	0,1	4,8	4,8
Food, beverages and tobacco	2,1	0,9	17,1	20,1
Textiles, confections and footwear	0,6	0,0	43,0	43,6
Chemicals and petrochemicals	0,4	1,9	10,5	12,8
Metals and derived products	0,1	0,6	13,6	14,3
Machinary and equipment	0,4	0,0	10,0	10,5
Other manufactures	0,3	0,0	19,6	19,9
Average	**0,8**	**0,8**	**17,8**	**19,5**

Source: Authors' calculations, based on official information of the World Trade Organization and official information from all countries. In all cases, for weighting the different protectionary measures, bilateral import information of the COMTRADE database was used.

[a] Tariffs are weighted for all bilateral Central American relations at a 6-digit level of the Harmonized System. Preferential tariffs granted in the General Treaty of Central American Economic Integration (TGIEC) were considered.

[b] Calculations produced from a gravity model that used the database of non-tariff measures (NTMs) of the World Trade Organization, and a series of control variables (distance, average tariff, belonging to a trade agreement, among others). The series used encompassed the period 2001-2015.

[c] All estimations were obtained through an amplified gravity model, which estimated the elasticity associated to necessary export and import times. Based on such elasticities, the tariff equivalents were obtained at a bilateral and sectoral level between the countries of the subregion. The table presents the weighted averages at a subregional level.

B. Value chains and intraregional trade

Various studies on the presence of Central American value chains have determined ample potential at an industrial level from bilateral relations between Costa Rica, El Salvador and Guatemala. Next in importance are bilateral relations between Guatemala and Honduras, and at a lower scale, those that between the four countries referred to and the rest of the partners in the subregion (Nicaragua and Panama). The main industries linked to the subregional chains in Central America are petrochemical, chemical, pharmaceutical, and agroindustry, as well as the spinning, paper and cardboard, and telecommunication equipment industry (Durán and Zaclicever, 2013). Recently, the spectrum is being enlarged towards industries of iron, steel and mechanical metals, considering these to be the backbone of a large part of national industries in the subregional countries, due to the large amount of intermediate inputs necessary to complete export production (metallic containers, intermediate goods, materials and equipment to generate new plants, etc.).

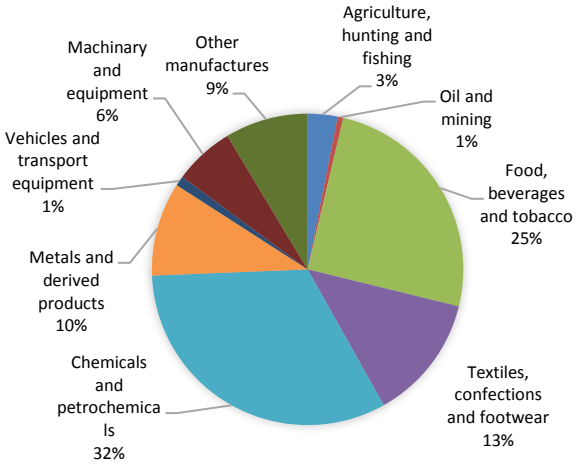
A significant proportion of intraregional trade involves double-track trade of intermediate inputs in all industries above mentioned. In most (except for the industries of textiles, confections and footwear), the intra-subregional trade coefficient is above average (25.4%), reaching its highest level (44%) in chemicals and petrochemicals (see figure 3 and Annex 3 and 4). Although intra-subregional trade is high in some sectors, it is

still below its potential as long as there is empirical evidence that the elevated costs are impairing it (ECLAC, 2017). Intra-Central American trade could be increased from its current level, especially in low and medium technology products, and in manufactures based on natural resources. In all sectors, the calculated potential is near 30% (Durán and Lo Turco, 2010). One of the reasons why said level hasn't been reached is due to the existence of a series of administrative barriers that increase exporting costs and transit time for merchandise.

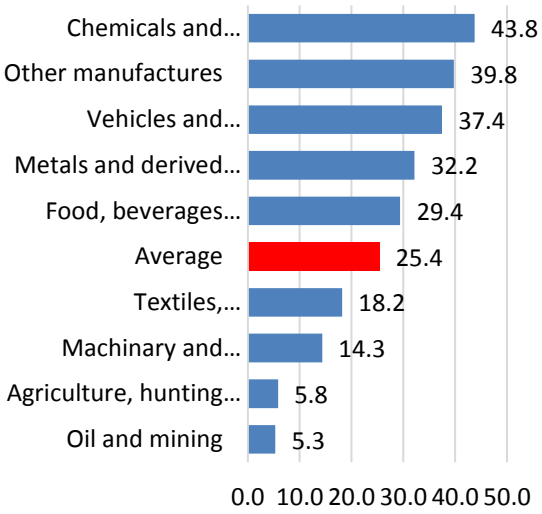
Figure 3
Central America: Intra-subregional export distribution and intra-subregional trade coefficients [a], 2016

(Percentages of the total)

a) Intra-subregional export distribution



b) Intra-subregional export coefficient



Source: Author, based on official COMTRADE database of the United Nations.

[a] In calculating intraregional trade coefficients, exports from free zones were considered.

The difficulties associated with several administrative and logistical bottlenecks (high transport costs, information difficulties, communication, lack of services, among others) are not a new problem, and are transversal in all Central American countries (Aráuz, 2002; Kelleher and Reyes, 2014). Such barriers mostly affect imports from Nicaragua and El Salvador, with *ad valorem equivalent* tariffs of 25.3% and 18.3%, respectively. In the case of Panama, *ad valorem* tariffs are of 9% on average. The textiles, confection and footwear sectors, as well as agroindustry products, present surcharges higher in all Central American countries (see table 3). These barriers have a negative impact on the competitiveness of regional exporting firms, from which approximately 50% export in the common market[3]. Small and median exporting firms are especially impacted by these kinds of barriers since they represent close to 75% of total firms that operate in intra-Central American circuits (see table 4). Of these, in turn, it is medium exporting firms that contribute more to the subregional exporting process (CENPROMYPE, 2017). Likewise, these high costs negatively affect the final price that consumers pay, thereby affecting the wellbeing of Central American households (World Bank, 2013). For this reason, regional countries have been trying to impulse TF programs that could reduce logistical bottlenecks through the simplification and modernization of customs operations.

[3] This value was obtained by dividing the number of exporting firms registered in Central America in 2017 (7 751), by total exporting firms reported for each country, which was estimated to be around 15 200 (circa, 2015).

Table 3
Central America: Ad valorem equivalents estimated for administrative barriers, 2017
(In percentage of the value of imported products)

Main sectors	Costa Rica	Guatemala	El Salvador	Honduras	Nicaragua	Panama
Agriculture, hunting and fishing	26,4	26,8	36,6	26,8	33,4	11,3
Oil and mining	5,1	1,1	1,0	0,6	7,0	2,0
Food, beverages and tobacco	14,6	17,8	15,6	17,8	19,6	7,3
Textiles, confections and footwear	33,8	30,1	36,5	28,3	61,7	21,8
Chemicals and petrochemicals	12,3	6,2	3,3	14,2	20,0	7,7
Metals and derived products	12,3	13,0	13,0	10,4	19,7	9,0
Machinery and equipment	8,1	9,7	7,5	9,4	19,0	6,2
Other manufacturing	21,0	15,6	17,4	15,6	31,2	11,5
All sectors	16,3	14,0	18,3	15,8	25,3	9,0

Source: ECLAC, estimations obtained through an amplified gravity model, which estimates the elasticity of export and import time. The table shows weighted averages of the bilateral AVEs for each Central American country in reference to the rest of its partners in the subregion.

Table 4
Central America (5 countries): Firm participation based on size and amount exported, 2016
(In percentage of total amount exported to Central America, millions of dollars and number)

Countries	Big exporters (% of total)	Micro, little and medium exporters (% of total)	Total amount (# of firms and millions of dollars)
Costa Rica			
Firms	18,3	81,7	1 343
Amount exported	86,4	13,6	825
Guatemala			
Firms	22,4	77,6	3 317
Amount exported	87,1	12,9	2 187
Honduras			
Firms	32,0	68,0	804
Amount exported	93,1	6,9	654
Nicaragua			
Firms	30,5	69,5	550
Amount exported	92,5	7,5	298
El Salvador			
Firms	32,8	67,2	1 737
Amount exported	94,7	5,3	1 255
Central America (without Panama)			
Firms	25,6	74,4	7 751
Amount exported	89,9	10,1	5 218

Source: ECLAC, calculation in based on customs registries information from the Secretariat of Central American Integration database. To determine each firm's category and comparability between countries, a normalizing process was used considering relative country sizes, measured as a proportion of GDP and Economically Active Population, and a correction index that standardized the export sales threshold in function of the propensity to export goods. For a detailed review of the employed methodology, refer to Alvarez and Durán (2018), Manual of micro, little and medium firms. Second edition. Of next appearance.

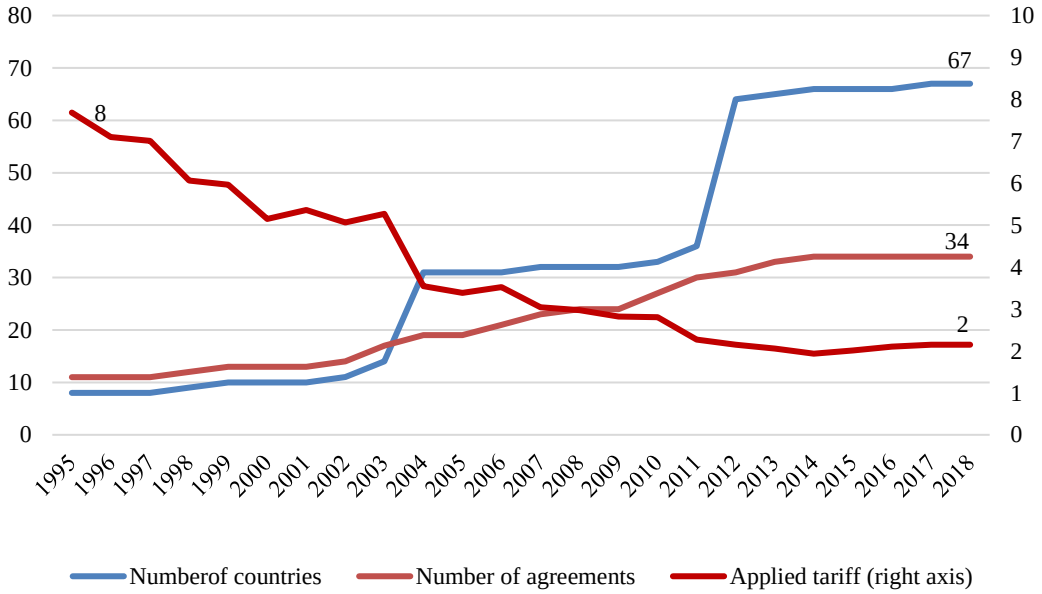
C. Customs Union and Trade Facilitation

Every Central American country has signed the Trade Facilitation Agreement (TFA) of the WTO, which has as its main objective to increase the speed of dispatch, movement and transit of merchandise at a global level. The countries agreed to adopt a series of measures such as applying a single window, implementing a single authorized operator, the use of electronic mediums to exchange data (customs declarations, issuance of licenses, the shipment of maritime and air freight manifests), electronic publication of mandatory customs procedures, the electronic exchange of certificates (origin, sanitary and phytosanitary) and customs data, the reduction of physical audits, and the cooperation of customs agencies, among others.

Parallel to the ATF, Central American countries have focused on intraregional trade facilitation, for which the countries have complementary regulations. In line with this, the presidents of SICE, in mid 2014, instructed the Council of Economic and Trade Ministers (COMIECO in Spanish) to work on a Central American Trade Facilitation and Competitiveness Strategy (EFCC in Spanish), emphasizing the need for coordinated management of borders in the Central American logistics corridor. Since 2015, all countries have counted on an action plan that contains 5 concrete measures: i) an anticipated declaration of merchandise; ii) streamlined and coordinated migration controls; iii) issuance of phyto and zoosanitary electronic certificates; iv) registration through Radio Frequency devices; and v) use of camera systems at border crossings. The full application of a Customs Union is a process still being developed, which is expected to be completed towards the end of 2024. There are three main action lines to achieve this: i) free circulation of goods and trade facilitation, ii) modernization and normative convergence; and iii) institutional development (COMIECO, 2015).

In recent years, the countries have promoted initiatives related to the full application of the Customs Union (predicted in 1960 after the signing of the General Agreement on Central American Economic Integration, but yet to be concreted). The last bilaterally subscribed agreements by the countries have increased the collection of regional agreements (34) and the number of partners (67). This caused delays in the application of a unified customs tariff, which had to be compatible with different tariff reduction schedules for each free trade agreement subscribed, but which were modifying the average tariff that countries were applying, resulting in the impossibility of fully harmonizing the community tariff (see graph 4). The most emblematic case in this process is the Free Trade Agreement between Costa Rica and China, in force since 2011, and which has liberalized for Costa Rica 68% of tariff lines (COMEX, 2010), and projected to increase to 88.5% in 2021. As the rest of the Central American partners are not in a similar agreement, the full application of the Customs Union in tariff matters is much more difficult than with agreements subscribed to between the United States and the European Union, where finally, calendars have been converging as years pass.

Figure 4
Central America: Development of subscribed trade agreements
(Number of agreements, countries and percentages)



Source: Author, based on weighted most favored nation tariff data presented by the World Bank, the tariff database of the World Trade Organization, the Secretariat of Central American Economic Integration, and information from the trade agreement data base of the Organization of American States. The number of countries considers all countries with which at least one country in the subregion has an in-force trade agreement with. To see in detail all subscribed agreements, see table II.1 of chapter 2 of this volume.

The first attempt to consolidate a Customs Union was in 2000, boosted by El Salvador and Guatemala and the adherence of Nicaragua and Honduras to such efforts. With this base, and plastered on a framework agreement for the establishment of the Customs Unification, the countries negotiated the Association Agreement with the European Union (UE). After closing said negotiations with the EU, five countries (Costa Rica, El Salvador, Honduras, Guatemala and Nicaragua) ratified their willingness to achieve a Customs Union, although lacking concrete efforts by all members[4]. The largest advance has come from the establishment of the Customs Union between Guatemala and Honduras in June 2017. The next section presents results of the evaluation of this process by ECLAC. The evaluation was carried out on the base of political scenarios that consider the reduction in administrative costs from their estimated level to 60% lower in an ambitious scenario, and alternatively to 30% lower, in one less ambitious. It is clarified that the exercises do not consider the full application of a common external tariff to third countries. Likewise, results of the inclusion of El Salvador in the CU above described are presented. In this case, the applied Trade Facilitation Program would extend the unified customs union territory to all countries of the Northern Triangle. For this, similar scenarios were considered to those described above, with the distinction that these cases include three countries (El Salvador, Guatemala and Honduras).

Table 5 presents the *ad valorem equivalents* calculated for the simulated scenarios considering the *status quo* (initial situation), as well as the reduction in the scenarios (ambitious and moderated) for the

[4] In Cordero (2016) all bilateral efforts to implement the Customs Union are detailed. El Salvador and Honduras, in 2011, Guatemala and El Salvador in 2012, and Costa Rica and Panama in 2005. For more information, refer to this document.

bilateral liberalization between Guatemala and Honduras; and the Northern Triangle (which includes El Salvador).

Table 5
Central America: Scenarios of deepening the Customs Union
(AVE in percentage of product value)

Sectors / scenarios	Deepening of Customs Union, Honduras – Guatemala (17% of intra-Central American commerce)			Deepening of Customs Union in Northern Triangle (52% of intra-Central American trade)		
	Status quo[a]	Ambitious scenario (60%)	Moderate scenario (30%)	Status quo[b]	Ambitious scenario (60%)	Moderate scenario (30%)
Agriculture, hunting and fishing	29,0	11,6	20,3	35,5	15,5	25,5
Oil and mining	47,5	19,0	33,3	0,8	0,3	0,6
Food, beverages and tobacco	15,6	6,2	10,9	18,2	10,9	14,6
Textiles, confections and tobacco	48,4	19,3	33,8	34,2	13,7	23,9
Chemicals and petrochemicals	22,5	9,0	15,7	9,7	3,9	6,8
Metals and derived products	3,7	1,5	2,6	12,0	6,1	9,0
Machinery and equipment	34,3	13,7	24,0	11,3	5,5	8,4
Other manufacturing	23,5	9,4	16,5	16,1	6,7	11,4
All sectors	**28,2**	**8,3**	**14,4**	**17,8**	**8,4**	**13,0**

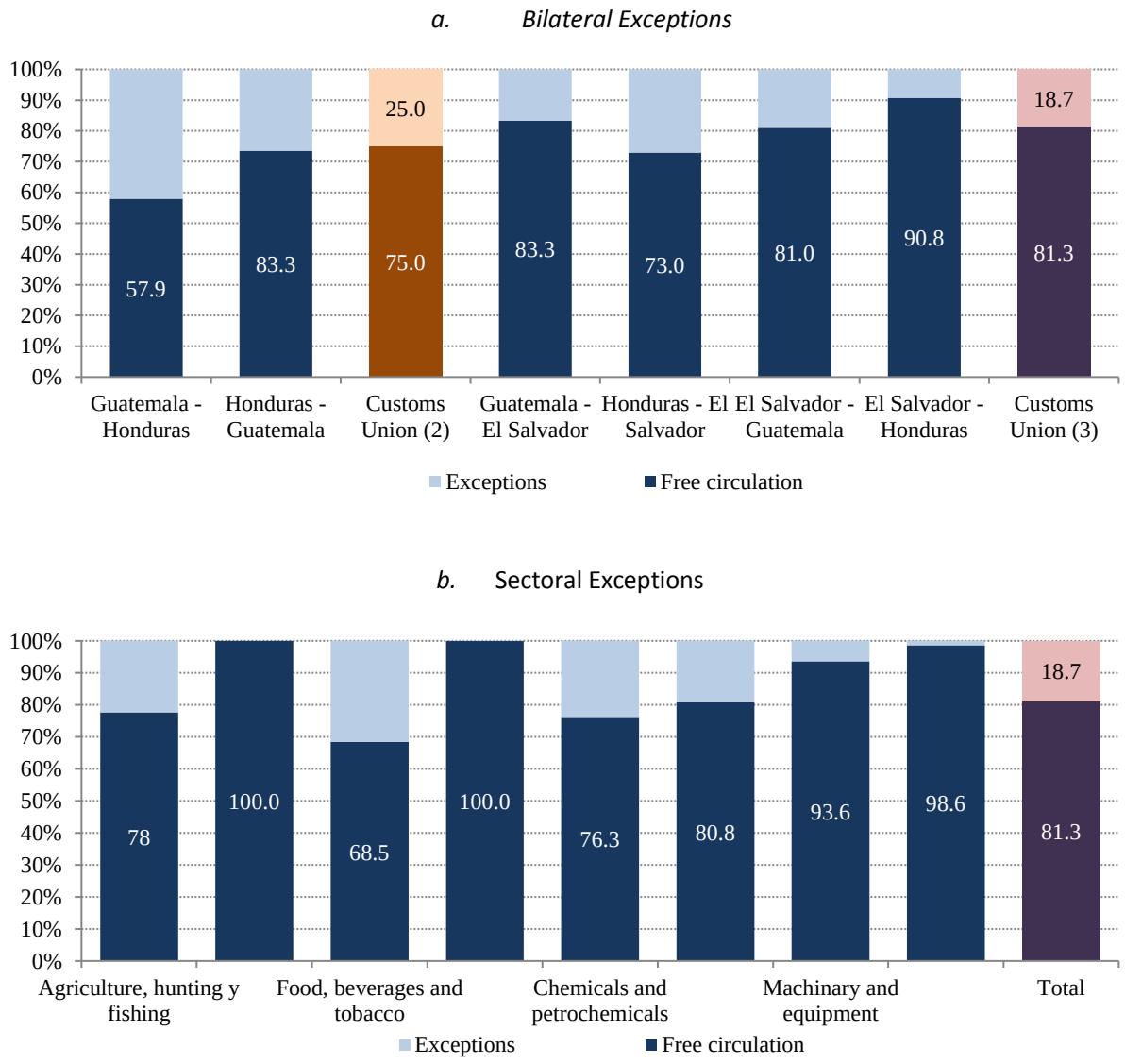
Source: ECLAC, based on the *ad valorem equivalent* estimates and the application of criteria for implementing a trade facilitation plan among the intervening countries. Values presented in the table consolidate bilateral estimates of all included countries in each simulation. In the applied CGEM the tariff shocks are included at a bilateral level and by product group.

[a] Considers only the calculated AVEs for the bilateral exchanges between Guatemala and Honduras.

[b] Includes all bilateral relations between the countries of the Northern Triangle (El Salvador, Guatemala and Honduras).

In defining the simulated scenarios, the official lists of exempt products from the Trade Facilitation Program was considered, which reach 25% of all bilateral exchange between Honduras and Guatemala; and 19% in the case of trade exchange between all members of the Northern Triangle. As to product groups, the major exceptions are chemical and petrochemical products, mainly derived from oil, as well as some foodstuff (vegetable oils, animal food, pork sausages, rice, yeast, among others) (see figure 5).

Figure 5
Northern Triangle: Imports subject to the regime of free circulation of merchandise in the process of deepening the Customs Union; 2015-2016
(As percentage of total imports)



Source: ECLAC, based on COMTRADE data of the United Nations.

Table 6 shows the changes that would arise in tariff protection in all of Central America if a trade facilitation program was implemented involving all Central American members of the Central American Economic System (SIECA in Spanish). As in previous scenarios, in this case two scenarios were considered: one ambitious which assumes a reduction of 60% of administrative barriers, and one more moderate, with a reduction of 30%. Unlike previous exercises, in this case, at the moment of defining the scenarios the lists of exemptions were not considered, for which uniform reductions of AVE are assumed.

Table 6
Central America: Consolidated scenario of the full application of the Central American Customs Union
(All member countries, AVE in percentage of product value)

Sectors	Status quo	Ambitious Scenario (60%)	Moderate Scenario (30%)
Agriculture, hunting and fishing	33,4	13,4	23,4
Oil and mining	4,8	1,9	3,4
Food, beverages and tobacco	20,1	8,0	14,1
Textiles, confections and footwear	43,6	17,5	30,5
Chemicals and petrochemicals	12,8	5,1	8,9
Metals and derived products	14,3	5,7	10,0
Machinery and equipment	10,5	4,2	7,3
Other manufactures	19,9	8,0	13,9
Total	**19,5**	**7,8**	**13,6**

Source: ECLAC, based on *ad valorem* estimates and the application of criteria implementing a trade facilitation plan among the intervening countries. Values presented in the table consolidate the bilateral estimations for all countries included in each simulation. In the applied CGEM the tariff shocks are included at a bilateral level and by product group.

With the purpose of guiding decision making, ECLAC developed a series of exercises to simulate the described scenarios, so as to evaluate the costs and benefits associated with its implementation. For this, expected changes were introduced in a computable general equilibrium model, and starting from a central scenario calibrated in a situation defined as *status quo*, several new simulations were produced to derive the sectoral profits or losses after the application of the described scenarios.

The main results for the first series of scenarios were presented to the authorities of each country with the purpose of supporting the negotiation process for Guatemala and Honduras. These were later made public in the study "possible economic and social effects of deepening the customs Union between Guatemala and Honduras". In the case of implementing the study of the Customs Union between countries and the Northern Triangle, it is a process being developed in conjunction with the Central Reserve Bank of El Salvador, the Minister of Finance of said country, and the Secretariat of Central American Economic Integration.

In this document the results of both works are presented in a comparative form, including also simulations for the extended Customs Union, understanding that the countries advance in full application of trade facilitation measures to reduce transit time and the extra-costs associated with administrative barriers, such as the implementation of special posts at the border with trade facilitation, electronic exchange in line of certificates of origin, and use of quick response codes (QR) for scanned documents and vehicles, mainly trucks, among others. In this way, it is possible to consider in perspective not only the impacts for countries that have adhered to said processes, but also for those that are now excluded, but that, as we have indicated previously, would be involved in the future. It is clarified that the simulations do not include the reduction nor increase in tariffs applied in bilateral trade agreements, nor the revision of the remaining protection of the "A" list of Guatemala Protocol. These remain in force.

The results to be analyzed include effects on production, trade and employment, and when possible, on poverty and income distribution. Likewise, estimations of the effects of tariff collection are included due to the

expected change in imports of goods, and on the tax collection at an aggregate level associated with final consumption of such goods.

IV. Expected results of the application of trade facilitation programs at a Central American level

This section presents results for three series of scenarios in a comparative fashion, in order to derive some general conclusions that could feedback into the process of Central American integration. The projected changes at a macroeconomic level are indicative of the impact that each economy would receive after applying a trade facilitation program, depending on whether it is a more or less ambitious scenario. Starting from the change in economic activity, it also produces effects in fiscal income and social indicators. All these results are presented next.

A. Macroeconomic results

In order to analyze the impact of the sum of diverse initiatives and engagements assumed by the countries to reduce administrative costs to trade, macroeconomic results are presented comparatively for the scenario of the Customs Unification of Guatemala and Honduras, and that of a similar process but including El Salvador (the Northern Triangle scenario). In both cases, results are separated based on level of ambition.

The Customs Union promoted by Guatemala and Honduras shows a change in GDP of between 0.2 and 0.8%, with more variation in the ambitious scenario. Honduras faced a higher variation (0.7% in the ambitious scenario), and Guatemala a lower positive variation (0.4% in the same scenario). Equally, the changes in trade were larger for Honduras, although economic and export activity would be stimulated in all territories of the Union. The impacts are positive and larger under the ambitious scenario, resulting also in an increase in wellbeing for consumers, with a positive impact on employment for non-qualified workers (see table 6 and graph 6).

The positive variation on wellbeing (between 73 and 171 million dollars for the case of Honduras and between 89 and 206 million dollars for the case of Guatemala, depending to the scenario considered), is explained mainly by the increase in tax collection originated from the increase of imports, and by the higher employment in non-qualified labor (ECLAC, 2017). To this, the effect of lower administrative costs on the terms of exchange is added, which increases the competitiveness of traded products in the Customs Union. Extending this to El Salvador produces a larger variation in all macroeconomic variables, and increases the wellbeing of individuals in all three countries. The amount increases to 419 million dollars in the ambitious scenario, and to 187 million in one more moderate (see table 7).

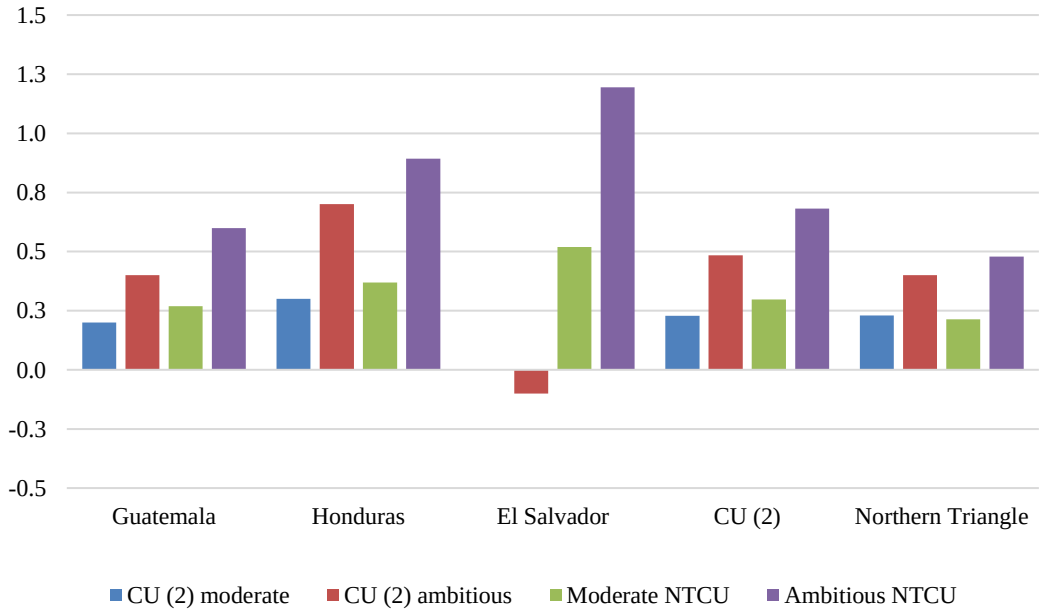
Table 7
Percent change in macroeconomic variables due to reductions in administrative barriers in Guatemala-Honduras and Northern Triangle scenarios

(Percent variations with respect to the base line and millions of dollars)

Variable	Customs Union between Guatemala and Honduras (CU2)		Northern Triangle Customs Union (NTCU)	
	Less ambitious (30%)	Ambitious (60%)	Less ambitious (30%)	Ambitious (60%)
GDP	0,2	0,5	0,3	0,8
Exports	0,7	1,8	0,7	2,1
Imports	0,5	1,7	0,9	1,.8
Total employment	0,4	0,5	0,4	1,0
Employment (qualified labour)	0,6	0,8	0,4	1,0
Wellbeing[a] (millions of dollars)	162	377	187	419
Percentage of GDP	**0,2**	**0,6**	**0,2**	**0,5**

Source: ECLAC, in base of general equilibrium model GTAP, version 9.
[a] Wellbeing measures the amount of wealth in terms of the income that the consumer receives (or loses) by the increase in utility (or reduction), supposing that prices do not change.

Figure 6
Effects on GDP (countries and groupings) of several simulated scenarios
(Percent variations with respect to baseline)



Source: ECLAC, based on general equilibrium model GTAP, version 9.

As in any scenario of change in international trade, there are winning and losing sectors. The biggest positive impacts in economic activity are found in chemicals and petrochemicals, food, beverages, and tobacco, textiles, confection and footwear, as well as in machinery and equipment and other manufacturing.

Among the sectors that see their production reduced in the scenario of a Customs Union between Guatemala and Honduras, it is mainly oil and mining (-0.8%), and agriculture, forestry, hunting and fishing (-0.2%). The inclusion of El Salvador in the Customs Union results in bigger positive effects on trade, at the same time allowing to mitigate negative effects in the agroindustry and the production of metals and derived products. In both cases, production and trade is expanded (see table 8). The higher demand in other sectors such as textiles, confections and footwear, food, beverages and tobacco, metals and derived products, chemical and petrochemicals and other manufactures allow non-qualified labor employed in primary sectors with low, or non-existent growth (agricultural and oil and mining) to be absorbed by these other sectors.

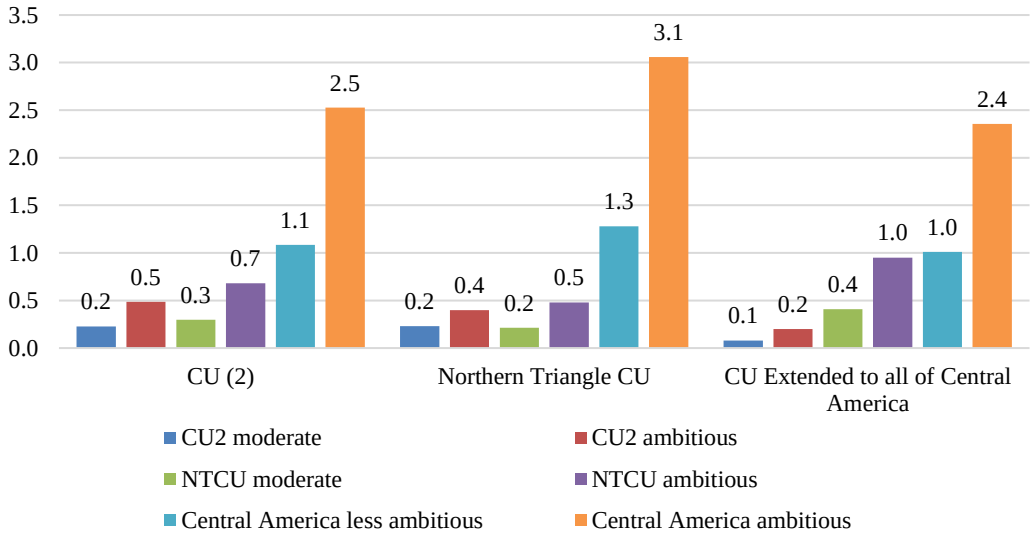
Table 8
Percentage change in production, imports and exports at a sectoral level in Guatemala-Honduras and Northern Triangle, under the scenario of a 60% decrease of administrative barriers
(Percent variation with respect to base line)

Sectors	Customs Union between Guatemala and Honduras (CU2)			Northern Triangle Customs Union (NTCU)		
	Production	Imports	Exports	Production	Imports	Exports
Agriculture, forestry and fishing	-0.2	1.2	0.2	0.1	1.5	-0.3
Oil and mining	-0.8	2.8	-1.4	-0.6	1.6	-0.9
Food, beverages and tobacco	-0.1	2.4	0.1	0.6	3.7	3.7
Textiles, footwear and confection	2.8	4.5	5.3	1.4	2.6	3.2
Chemicals and petrochemicals	1.5	1.1	6.3	1.7	0.9	6.7
Metals and derived products	-0.2	1.6	-1.8	0.8	2.4	3.0
Machinery and equipment	0.5	1.9	4.0	0.0	1.5	0.5
Other manufactures	0.9	2.7	4.7	1.6	3.1	8.6
Services	0.4	-1.9	-0.9	0.9	1.2	-1.6
Total	**0.5**	**1.7**	**1.8**	**0.8**	**1.8**	**2.1**

Source: ECLAC based on general equilibrium model GTAP, version 9.

The Customs Union simulations extended to all countries of the isthmus results in positive GDP variation that surpasses the variations experienced by the countries under the preceding scenarios. The inclusion of more countries in the trade facilitation program, whether moderate or ambitious, results in a positive product variation of between 1% and 2.4% respectively. These variations surpass all results obtained under the results of a Customs Union between Guatemala and Honduras (CU2), and that of the Northern Triangle Customs Union. GDP variation for all of Central America increases from 0.2% when only CU2 operates, to 1% in the case of the customs union formed tripartite between El Salvador, Guatemala and Honduras, to an average variation of 2.4% for the case of the extended Central America Customs Union. Likewise, for every country group, and for countries individually considered, the impacts are favorable, and highest in the cases of Guatemala and Honduras, which would reach GDP variation of 2.9% and 4.5% respectively in the ambitious case. In the less ambitious case, although all countries receive positive effects, these are higher in the case of Guatemala. In all extended Customs Union simulations, Costa Rica receives the least impacts, although it manages to revert the trade deviation that is produced in the preceding scenarios, under which it presents a null or slightly negative expansion of total exports. A similar pattern can be noted in the case of exports of Nicaragua and Panama (see figure 8).

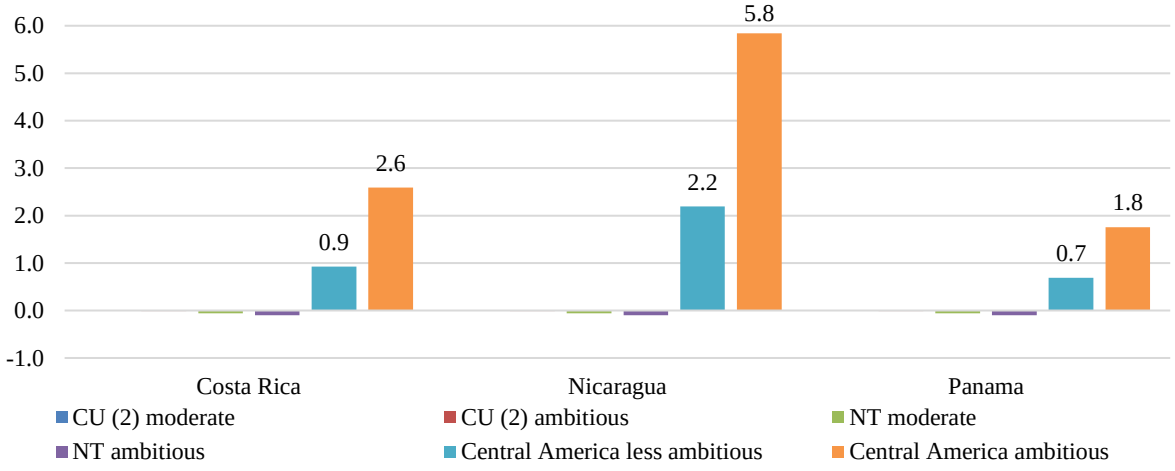
Figure 7
Central America: Effects on GDP of the diverse Customs Union scenarios simulated
(Percent variations with respect to the base line)



Source: ECLAC, based on GTAP model and general equilibrium base, version 9.

In all simulations, a favorable effect of the extended Customs Union on employment is noted, especially on non-qualified labor, for which income increases. Equally, the change in consumer welfare, measured in terms of GDP, is positive in all countries (See table 9). This is explained mainly by the increase in competitiveness of international trade operations due to improved prices. It highlights too the favorable impact of improved prices on trade, mainly due to the expansion of imports. When dealing with transversal results to all economic agents, small and median exporting firms receive incentives to boost their international trade operations in neighboring markets. It is here that the effect of improved administration is seen to be more favorable for larger firms since they rely on specialized areas to resolve bottlenecks in customs formalities. This is not the case with smaller companies. Another important effect is the increase in consumption of imported goods, which has fiscal repercussions due to higher value-added tax collected by the treasury.

Figure 8
New partners in Central American CU: Effects of goods exported
(Percent variation with respect to the base line)



Source: ECLAC based on the GTAP model and general equilibrium base, version 9.

Table 9
Central America: Macroeconomic effects of an extended Customs Union
(Percent variation with respect to base line, and millions of dollars)

Main sectors	Costa Rica	Guatemala	El Salvador	Honduras	Nicaragua	Panama
Ambitious scenario (60% AVE reduction)						
GDP	1,0	4,5	2,4	2,9	2,4	2,1
Exports	2,6	12,0	5,9	6,7	5,8	1,8
Imports	2,9	9,0	5,1	6,3	5,5	2,0
Total employment	1,0	2,0	1,0	2,4	2,7	1,6
Employment (non-qualified labour)	2,1	3,4	1,8	3,9	4,2	2,5
Wellbeing[a] (millions of USD)	518	614	627	592	299	625
Percentage of GDP	1,2	2,5	1,3	3,1	2,8	1.9
Moderate scenario (30% AVE reduction)						
GDP	0,5	1,8	1,1	1,1	1,1	0,9
Exports	0,9	4,6	2,3	2.5	2,2	0,7
Imports	1,0	3,5	2,0	2,3	2,1	0,8
Total employment	0,4	0,8	0,4	0,9	1,1	0,7
Employment (non-qualified labour)	0,8	1,3	0,7	1,5	1,7	1,0
Wellbeing[a] (millions of USD)	238	255	284	209	135	257
Percentage of GDP	0,6	1,0	0,6	1,1	1,3	0,8

Source: ECLAC based on the model and general equilibrium base GTAP, version 9.
[a] Wellbeing is measured as the amount of wealth (in terms of income) that the consumer receives (or loses) when their utility level is increased (or reduced), supposing that prices do not change.

B. Effects on tax collection

An important concern in analyzing the simulated scenarios is on the expected impacts on tax revenues, concretely on the possibility that the eventual deepening of the Customs Union could erode tax collection in participating countries. It is clarified that the results presented here do not consider a decrease in applied tariffs to third countries, nor disbursements for investments in customs infrastructures. Uniquely, they reflect the impact of trade facilitation measures on the flows of traded goods, which are then subject to collection through value added or special taxes. That is to say that the analyzed tax collection is calculated as the fiscal effects derived from the increase in imports after applying a trade facilitation program.

The application of an ambitious trade facilitation program between Honduras and Guatemala would increase tax collection by 37 and 41 million dollars, respectively, which is equivalent to 0.2% and 0.1% of GDP. If a less ambitious program is assumed, the positive effect expected on tax collection is less, reaching 21 and 27 million dollars for Honduras and Guatemala, respectively (see table 9).

In the scenarios that include El Salvador in the Customs Union, slightly higher increases are estimated in all cases, especially in the scenarios that consider more ambitious reductions in tariffs. Guatemala and Honduras would reach higher collection increases in the case of a bilateral Customs Union. In any case, the increases in tax collection for the set of countries of the Northern Triangle is maintained at around 0.1% of GDP.

Simulations considering an extended Customs Union also show a negative impact, estimating an increase in tax collection of between 324 and 652 million dollars depending on whether it’s a less or more

ambitious program. In terms of GDP, participation is increased to 0.3% in the ambitious scenario. The biggest impact in terms of tax collection would be in Nicaragua, Honduras and El Salvador. In Nicaragua, the increase in tax collection would reach 0.7% of GDP. This is because the tax rate in this country is among the highest between all member countries of the Central American Common Market. Other countries with estimated increases in tax collection under the ambitious scenario are Honduras and Guatemala. The first also with a high VAT rate (15%), and the second because it receives a larger increase in imports (9%). In all countries individually considered, the estimated tax collection after deepening the Customs Union is higher due to the benefits generated by the expansion of the customs territory (see graph and table 10).

ECLAC-COMEX (2015) estimated a similar exercise to that presented here for the case of a drastic reduction in *ad valorem equivalents*, in the order of 95% of the calculated values. If this were the case, the increase in tax collection for all of Central America was estimated in the order of 364 million dollars in 2015, and of 1 044 million dollars in an ambitious scenario, resulting in expected tax collections of between 0.2% and 0.5% of the combined GDP for Central America.

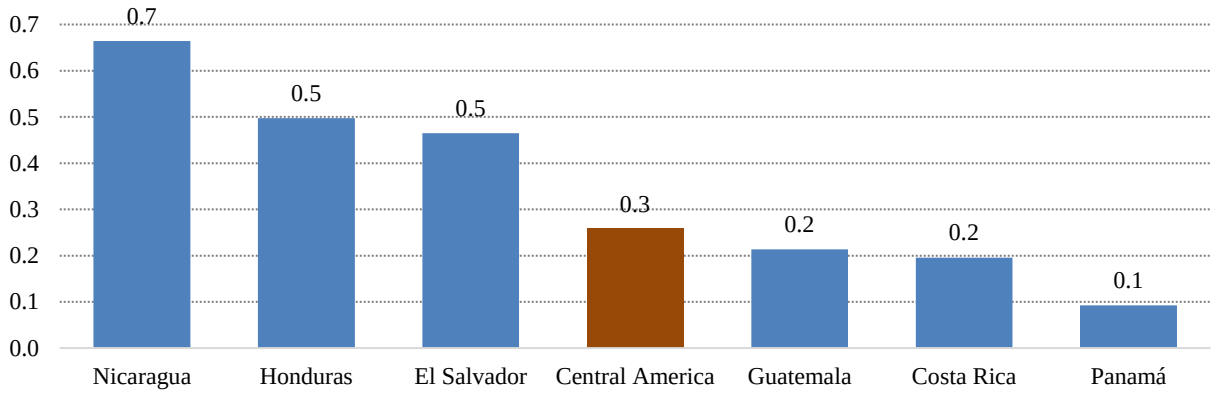
Table 10
Central America: Estimated increase in tax collection due to alternative trade facilitation programs according to the groups of countries that apply it
(In millions of dollars and GDP percentage)

Countries/groups of countries	Millions of current dollars			In percentage of GDP	
	Ambitious program	Less ambitious program	GDP (2017)	Ambitious program	Less ambitious program
CU2 (Guatemala and Honduras)	**78**	**48**	**93 481**	**0,1**	**0,1**
Guatemala	41	27	70 806	0,1	0,0
Honduras	37	21	22 675	0,2	0,1
NTCU (Northern Triangle)	**160**	**101**	**120 888**	**0,1**	**0,1**
El Salvador	52	34	27 407	0,2	0,1
Guatemala	59	40	70 806	0,1	0,0
Honduras	49	27	22 675	0,2	0,1
Central American Customs Union	**652**	**324**	**252 540**	**0,3**	**0,1**
El Salvador	127	56	27 407	0,5	0,2
Guatemala	151	71	70 806	0,2	0,1
Honduras	113	52	22 675	0,5	0,2
Costa Rica	115	68	58 909	0,3	0,1
Nicaragua	91	47	13 692	0,7	0,3
Panama	55	30	59 051	0,1	0,1

Source: ECLAC, based on microsimulations of increase in VAT after applying a trade facilitation program.

The countries' GDP was obtained from the official database of the Center of Studies for the Economic Integration (SIECA in Spanish). To calculate tariff collection, in each case, Value Added Tax rates declared in the Tax Legislation for each county were considered, including (if applicable) some special applied taxes, as well as the particular exceptions (medications and food). The tax rate generally applied was: (Costa Rica: 13%; El Salvador: 13%; Guatemala:12%; Honduras, 15%; Nicaragua, 15%; and Panama; 7%). Among the special cases, there is a 20% rate for cars in Guatemala, 18% for beverages and tobacco in Honduras; and 10% for alcoholic beverages in Panama. For more details see ECLAC (2017). The base information for calculating imports was obtained from the increase in imports by sector and country derived from the CGE model.

Figure 9
Central America: Estimated increase in tax collection resulting from an ambitious trade facilitation program
(In percentage of GDP)



Source: ECLAC, based on microsimulations made on the base of a CGEM.

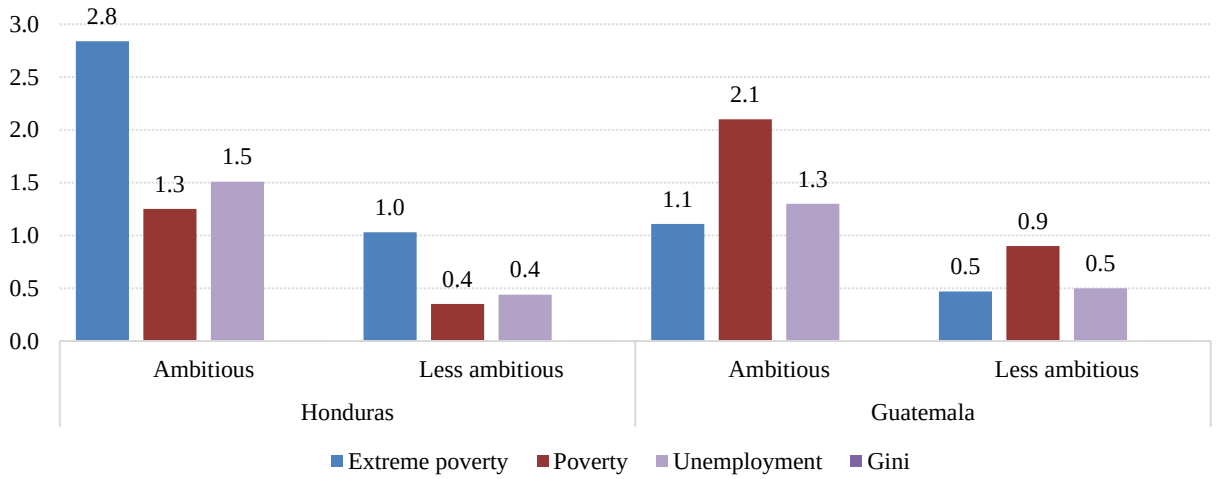
C. Effects on employment, poverty, and income distribution

In this section, results are presented for the case of a bilateral Customs Union between Guatemala and Honduras. Diverse factors determine the effect of trade facilitation on unemployment, poverty and income distribution. Firstly, the greater or lesser dynamism of exporting sectors that have received positive impacts after the reduction in administrative barriers. Secondly, the sectoral structure of employment and the qualification level of labor linked to such activities.

The employment structure of Honduras (2010) and Guatemala (2011) shows that the sector with highest employment is the sector of services; a macro sector covering 50% of employment which is composed in large part of transport, telecommunication, business and financial services, and all activities linked to international trade. In both countries non-qualified labor predominates, mainly in the primary sectors (more than 90% of total), with higher incidence of highly qualified labor in machinery and equipment (36%) and services (33%) (ECLAC, 2017).

In the ambitious and less ambitious scenarios mentioned previously, in Honduras, unemployment levels decrease in 1.5 and 0.4 percentage points respectively (see table and figure 10). Said results are derived from a decrease in the unemployment rate from 3.95% to 2.44% and 3.51% for the ambitious and less ambitious case, respectively. The unemployment reduction in Honduras is equivalent to an increase in employment levels of 51,000 new jobs for the case of an ambitious improvement in trade facilitation. In the less ambitious scenario, the increase in employment levels is estimated to reach at least 15,000 new jobs.

Figure 10
Guatemala and Honduras Customs Union: Effects on employment, poverty and income distribution
(Percent changes with respect to base line)



Source: Author, based on ECLAC (2017).

In the case of Guatemala, the reduction in the unemployment rate is of 1.3 percentage points for the ambitious scenario, and 0.5 percentage points in the less ambitious scenario. The unemployment rate decreases from 3.1% to 1.8% in the ambitious case, and to 2.6% in the less ambitious case. In an ambitious case of a reduction in non-tariff barriers, Guatemala would create close to 80,000 new jobs. Said figure diminishes to 30,000 if more moderate reductions are simulated. Given the higher incidence of non-qualified labor on employment, the sectors where the new jobs are concentrated are those more intensive on non-qualified labor than highly qualified labor.

Table 11
Microsimulation results: Customs Union between Guatemala and Honduras

(In percentage)

	Honduras			Guatemala		
		Scenario			Scenario	
	Base line	Ambitious	Less ambitious	Base line	Ambitious	Less ambitious
Extreme poverty	45,71	42,87	44,68	16,89	15,78	16,42
Poverty[a]	69,29	68,04	68,94	42,46	40,36	41,56
Unemployment[b]	3,95	2,44	3,51	3,10	1,80	2,60
Gini	0,5638	0,5621	0,5629	0,5165	0,5123	0,5145

Source: Author, based on ECLAC (2017)

Microsimulations model and based on Household Surveys Database (BADEHOG in Spanish), ECLAC

[a] The percentage of poor people includes all those below the poverty line.; [b] Unemployment includes rural and urban areas.

As to the effects on poverty and income distribution, measured by changes in poverty and extreme poverty indicators, it can be derived that trade facilitation would have a pro-poverty effect; reducing both indicators in both scenarios. While in Honduras, expected improvement in extreme poverty is higher, in the case of Guatemala, poverty is (see graph 10). This difference is partially explained by the fact that in Honduras

there are proportionately more people in extreme poverty than in Guatemala. Therefore, those that increase their income in Honduras contribute more towards people leaving extreme poverty than poverty.

Changes in inequality are rather marginal, since the Gini coefficient is maintained practically in line with the base line. Particular changes are perceptible uniquely to the third decimal, as can be noted in graph and table 10.

V. Conclusions

This chapter tackles one of the pending challenges in economic integration research; the identification of economic and social effects resulting from a trade facilitation program as encouraged by Honduras, Guatemala and El Salvador in their negotiations to extend the Customs Union currently in force between Guatemala and Honduras, intending to eventually include all Central American countries. To this end, and starting from a series of TF indicators (cost to export, import, time required to export and import, among others), the cost associated with trade barriers was estimated for eight economic sectors through the application of an augmented gravity model.

Results show that Central American trade in 2017 faced average rates of protection close to 20% (including tariff and non-tariff barriers), with an important prevalence of administrative barriers which are particularly high in Nicaragua and El Salvador, as well as at a bilateral level, where they are also especially high in bilateral trade between Guatemala and Honduras. By sectors, the most elevated costs are in agricultural products, the agroindustry, and textiles, confections and footwear industries. All this leads to a reduction in trade, and economic and social losses associated to lesser trade flows and higher payment of unitary prices by consumers.

Starting from estimations of sectoral *ad valorem equivalents* for bilateral trade, a computable general equilibrium model was calibrated, using the GTAP 9.0 database, and from there, simulations were carried out that reflect the possible changes in trade policy in terms of trade facilitation on trade relations between both countries. The key question to answer was 'What is the likely effect of the application of a concerted policy that unifies the customs territory?'. Firstly, the Customs Union between Honduras and Guatemala was analyzed, next the incorporation of El Salvador, and finally the creation of an extended Customs Union for all of Central America. The work was developed searching to derive macroeconomic and social effects of the application of a Trade Facilitation Program.

At a macroeconomic level, it was determined that a highly ambitious trade facilitation program (estimated at 60% cuts in *ad valorem equivalents* of administrative barriers) would allow for GDP increases of 0.4% and 0.7% for Guatemala and Honduras, respectively. Simultaneously, such program would allow the increase in imports of goods of 2.2% and 1.4% in Honduras and Guatemala, respectively. In the case of exports, increases of 2.2% and 1.5% for the same countries would be generated.

If the level of ambition of the trade facilitation program was lower, with a reduction in AVEs of 30%, there would still be GDP increases of 0.3% and 0.2% in Honduras and Guatemala, respectively, with more limited increases in trade flows of 0.6% and 0.8% for the case of exports for Guatemala and Honduras, and of 0.4% and 0.8% for the case of imports.

Wellbeing estimates calculated for the ambitious scenario show an improvement of between 171 and 206 million dollars, equivalent to 0.9% and 0.4% of GDP in Honduras and Guatemala, respectively. The largest benefit in terms of wellbeing comes from the improvement in distributive efficiency, as well as in terms of trade and increasing employment in non-qualified labor.

Incorporating El Salvador in the Customs Union already in place between Guatemala and Honduras shows positive variations for all three countries, with a combined GDP variation of between 0.3% and 0.8% depending on whether it is a more or less ambitious scenario. Equally, the model showed positive changes in trade, employment, and wellbeing, even slightly larger for Guatemala and Honduras. In all cases, the variations were larger than in the simulations of a Customs Union without El Salvador. The sectors that receive the largest variations were the manufacturing, machinery and equipment industries. It is noted that a large part of these sectors are highly influential in intra-Central American trade. Guatemala increases from 0.7% to 0.9% in the same scenario. In its part, El Salvador increases its GDP by between 0.5% and 1.2% depending on whether it's a more or less ambitious scenario.

Simulating an extended Customs Union for all countries of the isthmus yields higher positive GDP variation than the Customs Unions with less partners. The inclusion of more countries in the TFP, depending on whether a more or less ambitious scenario is assumed, derives positive GDP variation of between 1% and 2.4%. Clearly, the extended CU would generate positive effects when extending the customs territory to 100% of members in the Central American Common Market. Likewise, it is noted that the new countries (Costa Rica, Nicaragua, and Panama) also reach positive variation rates, and larger than those reached in the scenarios that do not adhere to a Customs Union, reverting null or negative growth rates under such scenarios.

The fiscal results expected after applying an ambitious program would increase tax collection for Honduras and Guatemala by 37 and 41 million dollars, which is equivalent to 0.2% and 0.1% of GDP respectively in the case of a bilateral Customs Union. In the case of this Customs Union being extended to include El Salvador in first instance, and later all Central American partners, the fiscal effect is larger, reaching a total amount collected of between 324 and 652 million dollars depending on whether it is an ambitious or less ambitious scenario. The increases in tax collection under the extended Customs Union scenario are present in all countries individually considered. The estimated tax collection upon deepening the customs Union is higher due to the benefits generated by the expansion of the customs territory. This result is derived from the positive impact on bilateral trade flows and from third markets. Therefore, enforcing the customs union through the application of a TFP does not show negative impacts on tax collection, rather, it generates an increase in the collection of internal taxes as the economic activity derived from trade expands.

The employment estimates associated to the expansion of employment in an ambitious scenario in the case of the bilateral Customs Union between Guatemala and Honduras, the only scenario for which such calculations were carried out, would generate a decrease in unemployment rates, poverty and extreme poverty. The unemployment reduction is equivalent to an increase in employment levels in both countries of 45 thousand jobs in the moderate scenario (15 000 in Honduras, and 50 000 in Guatemala), and up to 131 thousand in the ambitious scenario (51 000 in Honduras, and 80 000 in Guatemala).

Regarding the simulated effects on poverty, extreme poverty and income distribution, the existence of a clear pro-poverty effect is noted. This would be reflected mainly in a decrease of extreme poverty in Honduras, and a strong decrease of poverty in Guatemala. These results are explained by the low level of salaries in both countries, mainly in Honduras.

The study concludes that unifying the customs territories of Honduras and Guatemala would boost production and trade and increase tax collection due to the increase in imports. The effects expected on employment, poverty and extreme poverty would also be favorable, by increasing employment and reducing the number of households in poverty and extreme poverty in both countries. These results are amplified every time the custom territory expands, such that the Customs Union between the three countries of the Northern Triangle would result in the highest benefit in terms of production and wellbeing for all member countries. Equally, a future expansion of said Customs Union towards all members of the Central American Common Market would generate much wider positive impacts, strongly benefiting all members the union in macroeconomic, social and tax areas.

Finally, the amount of the benefits to be received upon the implementation of TF policies will depend on the degree of ambition the authorities of the countries involved put into the promotion of work aimed at achieving free circulation at border crossings with trade facilitation, as well as the completion and monitoring of the regulatory convergence and institutional development associated with the process.

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Annex 1

Main product groups considered in the applied CGEM

Number	Individual Sectors	Large product groups
1	Rice	Agriculture, hunting and fishing
2	Wheat	
3	Other cereals	
4	Fruits and vegetables	
5	Oilseefs	
6	Vegetable fibres	
7	Other crops	
8	Cattle	
9	Forestry	
10	Fishing	
11	Crude oil, gas and coal	Oil and mining
12	Non-energy mining	
13	Meat	Food, beverages and tobacco
14	Dairy products	
15	Vegetable oils	
16	Sugar	
17	Other foods	
18	Beverages and tobacco	
19	Textiles	Textiles, confections and footwear
20	Confections	
21	Leather and footwear	
22	Oil and byproducts	Chemicals and petrochemicals
23	Chemicals	
24	Iron and steel	Metals and derived products
25	Metal products	
26	Vehicles	Machinary and equipment
27	Transport equipment	
28	Electric equipment	
29	Machinary and equipment	
30	Paper products	Other manufactures
31	Wood products	
32	Non-metallic minerals	
33	Other manufactures	
34	Services	Services

Source: Author, based on GTAP dabatase and model, 9.0.

Annex 2

Countries and regions that make up the employed CGEM

Number	Regions / individual countries	Subregional groupings / countries
1	Costa Rica	Central American Common Market
2	El Salvador	
3	Guatemala	
4	Honduras	
5	Nicaragua	
6	Panama	
7	Argentina	MERCOSUR
8	Brazil	
9	Paraguay	
10	Uruguay	
11	Venezuela, R.B.	
12	Chile	Chile
13	Bolivia, E.P.	Andean Community
14	Colombia	
15	Ecuador	
16	Peru	
17	Dominican Republic	Countries of the Caribbean
18	Jamaica	
19	Trinidad y Tobago	
20	Rest of Caribbean	
21	Mexico	North American Free Trade Agreement
22	Canada	
23	United States	
24	European Union	
25	Japan	Asia and the Pacific
26	China	
27	Australia	
28	New Zealand	
29	South Korea	
30	ASEAN	
31	Others Asia Pacific	
32	Middle East and North Africa	Middle East and Africa
33	Sub-Saharan Africa	
34	Rest of the World	Rest of the World

Source: Author, based on GTAP dabatase and model, 9.0.

Annex 3

Central America (6 countries): Export distribution, according to destination in selected regions and partners, 2016

(In percentage of total and millions of dollars)

Sectors	Percentage of total (%)							Total exports (millions of dollars US$)
	CACM	RLAC	USA	EU	China	RAP	RW	
Rice	43.5	55.8	0.2	0.0	0.0	0.0	0.4	1
Wheat	6.4	24.8	18.7	0.2	0.0	0.0	50.0	0
Other cereals	41.8	57.8	0.2	0.0	0.0	0.0	0.2	10
Fruits and vegetables	2.4	0.4	62.5	30.5	0.0	1.0	3.1	4129
Oilseeds	16.4	30.8	11.0	22.5	0.1	13.1	6.0	133
Fibers and vegetables	36.6	11.1	24.5	6.8	0.0	18.0	3.1	2
Other crops	6.5	3.3	29.0	24.1	0.5	7.3	29.3	661
Cattle	66.0	20.8	3.8	4.8	0.0	3.4	1.2	178
Forestry	16.8	9.6	9.4	1.8	11.3	49.2	1.8	130
Fishing	5.3	9.4	40.2	26.1	0.2	9.3	9.5	929
Energy mining	32.4	1.5	0.0	66.1	0.0	0.0	0.0	0
Non-energy mining	5.3	2.1	56.6	13.7	0.6	7.2	14.6	1270
Meat	41.3	18.9	31.8	0.0	1.5	6.0	0.3	646
Dairy products	85.9	3.9	8.9	0.0	0.0	0.0	1.3	280
Oils	26.1	28.4	1.0	43.6	0.3	0.4	0.1	1056
Sugars	5.1	21.7	22.6	10.0	0.6	13.8	26.1	1499
Other foods	60.2	12.8	17.0	7.3	0.6	1.1	1.2	2543
Beverages and tobacco	13.5	7.9	30.6	30.1	0.2	9.7	7.9	3898
Textiles	69.5	20.4	5.4	0.3	0.0	0.8	3.5	826
Confections	9.8	12.2	70.6	0.9	0.1	0.4	6.0	6299
Leather and footwear	26.9	44.9	5.9	2.2	0.6	0.1	19.4	1189
Wood and its manufactures	26.9	7.3	57.4	2.4	2.6	0.9	2.5	166
Paper and related products	59.6	14.9	21.1	0.5	0.9	1.0	2.1	1136
Petrochemicals	66.0	7.3	24.8	1.6	0.0	0.0	0.2	395
Chemicals	42.7	20.9	28.5	2.8	0.1	1.4	3.6	8218
Non-metallic minerals	50.9	32.2	10.7	0.5	0.0	0.0	5.6	375
Iron and steel	63.6	12.9	6.2	5.1	5.4	4.4	2.3	918
Metal products	16.0	38.0	40.2	1.0	1.1	1.8	1.9	2219
Vehicles	39.3	45.7	5.3	0.8	0.3	1.1	7.5	273
Transport equipment	25.3	41.4	13.4	1.1	0.7	1.2	16.9	42
Electric equipment	23.0	50.6	10.7	0.5	0.1	0.9	14.2	1124
Machinary and equipment	11.9	19.8	48.4	10.8	0.2	3.2	5.6	3949
Other manufacturing	19.5	18.2	37.4	15.9	0.2	2.3	6.5	1210
Total exports	25.4	17.1	37.0	10.7	0.4	3.1	6.3	45706

Source: Author, based on GTAP dabatase and model, 9.0.

CACM = Central American Common Market

RLAC = Resto of Latin America and Caribbean;

USA = United States of America

EU = European Union

RAP = Rest of Asia Pacific

RM = Resto of World

Annex 4

Central America (6 countries): Import distribution, according to destination in selected regions and partners, 2016

(In percentage of total and millions of dollars)

Sectors	In percentage of total (%)							Total imports (millones de dólares US$)
	CACM	RLAC	USA	EU	China	RAP	RW	
Rice	0.0	33.9	66.1	0.0	0.0	0.0	0.0	187
Wheat	0.0	1.5	86.1	0.0	0.0	0.0	12.4	355
Other cereals	0.7	9.2	89.9	0.0	0.0	0.0	0.2	711
Fruits and vegetables	29.3	34.7	24.2	3.7	4.9	1.1	2.1	388
Oilseeds	11.4	5.4	75.4	6.1	0.1	0.2	1.4	186
Fibers and vegetables	0.4	0.7	97.2	0.1	0.0	1.3	0.2	109
Other crops	13.5	34.3	15.8	15.4	2.6	7.9	10.4	248
Cattle	64.4	3.7	26.5	2.1	0.2	1.8	1.3	172
Forestry	21.5	69.5	6.5	0.7	1.1	0.1	0.6	99
Fishing	35.5	25.1	6.8	0.7	12.6	10.5	8.9	164
Energy mining	0.0	87.0	11.0	0.8	0.0	0.1	1.1	164
Non-energy mining	36.5	27.4	11.0	2.9	8.7	4.8	8.7	251
Meat	35.9	5.9	57.2	0.2	0.0	0.1	0.6	700
Dairy products	57.2	5.6	19.6	4.6	0.2	12.6	0.2	398
Oils	29.1	6.7	56.4	3.1	0.1	1.3	3.4	944
Sugars	32.8	35.5	18.9	2.9	5.5	0.7	3.7	208
Other foods	37.0	21.2	25.1	7.9	1.7	1.7	5.2	3 732
Beverages and tobacco	36.1	16.4	14.6	20.5	3.2	5.1	4.1	1 267
Textiles	20.0	7.3	30.2	2.0	24.6	14.2	1.7	2 478
Confections	19.9	4.2	20.9	2.9	40.0	9.6	2.7	3 055
Leather and footwear	9.4	6.3	6.0	2.2	52.5	23.2	0.4	1 567
Wood and its manufactures	20.7	28.0	13.1	10.5	22.4	1.3	3.8	192
Paper and related products	24.0	22.2	38.1	5.6	4.0	3.9	2.3	2 541
Petrochemicals	3.4	7.7	81.6	1.2	1.0	1.2	3.9	6 142
Chemicals	14.8	20.5	21.2	13.1	8.6	16.5	5.2	16 299
Non-metallic minerals	20.0	28.7	11.8	10.1	22.4	3.7	3.3	827
Iron and steel	21.0	12.1	12.7	6.6	30.6	11.9	5.1	2 676
Metal products	10.7	28.1	24.0	10.2	17.5	5.6	3.8	2 147
Vehicles	0.8	10.1	25.2	7.1	11.5	43.8	1.4	4 530
Transport equipment	2.2	3.6	43.4	4.3	25.2	7.5	13.8	335
Electric equipment	2.8	8.8	34.2	2.3	33.1	17.8	1.1	4 165
Machinary and equipment	3.5	14.4	31.5	14.4	20.9	12.4	2.9	7 796
Other manufacturing	12.3	9.1	26.7	7.0	31.8	10.1	3.0	1 747
Total exports	**13.9**	**15.0**	**31.8**	**8.1**	**14.9**	**12.7**	**3.6**	**66 781**

Source: Author, based on GTAP dabatase and model, 9.0.

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